Project Information

Submission Date: 24th January 2025, Friday
Group Work

Project Scope
This project aims to allow students to apply knowledge acquired through weekly lectures and tutorials into application-based scenario.

Project Requirements
The project will focus on *SIX (6)* key areas, namely:

- Distribution Centre (DC) Processes
- Resources Planning
- DC Space Calculation and Layout Design
- Operational Costing
- DC Automation
- Safety and Security Management

The following items are to be uploaded into LMS before **24th January 2025, Friday, 0900hr** :

1. Soft-copy of the Final Report (PDF format)
2. Recorded Presentation of the project (mp4 format)

(A) Scenario

ALPHA PTE LTD (ALPHA) is a well-known grocery company which sells canned and dried food. It is currently looking for a new 3PL to help them set up and manage its new distribution centre (DC) in Singapore to serve its customers in the Southeast Asia region. ALPHA intends to import and distribute the product, canned mushroom (Product MUSHROOM) in this DC, and has high expectations when it comes to selection of 3PL. It expects the 3PL to be someone who understands and manages DC requirements very well.

As such, ALPHA has approached ORIENTAL LOGISTICS to submit an operations plan for this new DC as the latter is an internationally well-known provider of DC and transportation services.

As part of the DC Setup Team from ORIENTAL LOGISTICS, your team has been tasked to determine and evaluate the resources necessary to manage this DC. This

set of information is to be compiled into a proposal, and this will be submitted to the management of ALPHA for consideration.

You have been given the operational specifications, the expected daily volume and ALPHA's business assumptions in Appendix A and Appendix B respectively. These data are to be carefully considered in the solutions that your team will be proposing.

(B) Contents of the Business Proposal

In your proposal, you are required to provide solutions to the following :

a.   ORIENTAL needs to determine the expected INBOUND, OUTBOUND and STORAGE volume to plan for the DC resources (manpower and layout). ALPHA requires the 3PL to provide a **service level of 95%** - ALPHA looks at performance on a day-to-day basis.

       NOTE: A 'successful' day is where all the orders are fulfilled within the day. ALPHA only allows 5% of the days in a year to be 'unsuccessful' (which means some orders are not being fulfilled). Therefore, the planned DC resources must be sufficient to complete the daily work volumes so as to achieve 95% 'successful' days within a year. Your team needs to determine the volume X_0 that can support this service level.

       ALPHA has provided the daily volume data for Product MUSHROOM for each of INBOUND, OUTBOUND and STORAGE for the past one year of operations. This is shown in APPENDIX D. Based on this set of data, **recommend the estimated volume of Product MUSHROOM's X_0 for the Inbound, Outbound and Storage** respectively.

       Data Analysis Tools from MS Excel and statistical methodologies should be used to support your recommendation.

b.   ALPHA has decided to have the OUTBOUND operations to be available on a "24-hour/7-day" basis, while the INBOUND operation is to operate from Monday to Saturday 8.30am to 6pm. You need to derive the number of employees to be employed. Your answer should include the following information :

       (i)   Number of shifts per day
       (ii)   Start and End-Time of each shift
       (iii)   Number of permanent handlers and supervisors to be employed per shift
       (iv)   Number of temporary staff to be employed (if any)
       (v)   Amount of overtime hours to be done by each staff per week (if any)

       Workings, including the usage of the **Manpower Calculation Grids**, should be shown. ORIENTAL expects to use the manual process. There should be at least 2 Grids – 1 for INBOUND and 1 for OUTBOUND.

c. Sketch the possible **layout design** for this DC. The following diagram shows the floor plan of the facility. This facility has a clear ceiling height of 14 meters. (A blown-up version can be found on LMS.)

Recommend the locations of emergency exit doors and CCTV cameras. Suitable walking paths should be included, too.

PLAN VIEW OF WAREHOUSE LAYOUT

Roller Shutter Doors

Roller Shutter Doors

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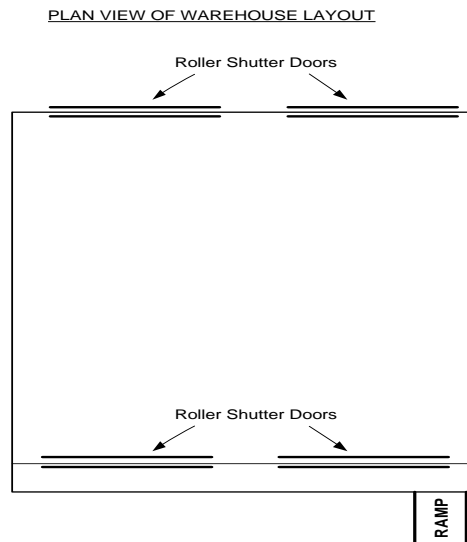
d. **Derive the following requirements :**

(i)   Number of Docks required
(ii)   Area of Working Space and Staging Space (for both Outbound and Inbound)
(iii)   Area of Storage Space
(iv)   Estimated total DC space area

e. **Propose the following prices :**

(i)   INBOUND price per **pallet**
(ii)   OUTBOUND price per **carton**
(iii)   STORAGE price per **carton**

f. ALPHA has the intention to expand into e-commerce operations in 2 years' time. It expects a Carton-In-Piece-Out type of operations and automation has to be implemented. **You need to advise ALPHA the following questions :**

(i)   Design the steps involved in the automated INBOUND and OUTBOUND processes.

(ii) Explain the differences between the steps used for the automated process in Question (f)(i) versus the manual process applied in Question (b).

(iii) Explain if there will be any changes in the layout plan applied in Question (c) and pricings in Question (e). [No calculation needed]

(iv) Describe the factors which ALPHA has to take note when comes to changing manual DC operations into an automated one.

The following appendices provide the basic information needed to answer Question (a) to (f).

Appendix A : Operational Requirements for Customer ALPHA
Appendix B : ORIENTAL's business assumptions
Appendix C : Productivity Guideline (only for the purpose of this project)
Appendix D : Historical data of daily INBOUND, OUTBOUND and STORAGE carton volumes for the past 1 year

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ASSESSMENT

(1)   Assessment Criteria

The project will be assessed based on the following weightage :

S/No	Assessment Break-down	
(I)	**Report**	**85%**
1.	Layout, Format & Organisation of write-up	10%
2.	Manpower Resources (Questions a & b)	25%
3.	DC Layout Design & Space Requirements; Safety & Security (Questions c & d)	20%
4.	DC Pricings (Question e)	15%
5.	DC Automation Implementation (Question f)	15%
(II)	**Group Presentation**	**15%**
	Total :	**100%**

(I)   Report

For Items 2 to 5, these will be assessed based on the following criteria :

- Relevance of recommended solutions to support operational requirements
- Clarity in explaining justifications made for recommended solutions
- Thoroughness in showing the workings for the quantitative figures

a. Your report must be comprehensive. It must include all the necessary detailed workings, diagrams, Excel outputs, tables and/or charts that you deem necessary to support your answers. Approximate all final answers to 1 decimal place unless otherwise stated.

b. Your project report must begin with a cover page (template in LMS).

c. Limit your report to less than 15 pages (Arial Font size 12 with 1.5 spacing) excluding tables and graphs. A good report is one that is concise and provides relevant analysis that aids the reader in making decision.

(II)   Group Presentation

The team is to conduct a 15-minute presentation about the key points of the proposal. The presentation should include information from ALL sections of the Project.

Presentation slides are to be prepared and shown during the presentation. Every team member will be required to present in the presentation and should have the same amount of air-time.

The group presentation is to be recorded and the duration of presentation should last not more than 15 minutes. It is strongly recommended to use MS Teams for the recording.

You are required to switch on your video cameras and be seen during the presentation, even if it is not your turn to present. All members should be presenting in the same presentation session.

(III)   Peer Appraisal

An online peer appraisal will be conducted amongst the group members. Each member will be appraised based on the following criteria:

i. Attendance and punctuality

ii. Participation and contribution to discussions

iii. Commitment and responsibility

iv. Quality of work

v. Supportive team player

Please alert your tutor early should there be any potential case(s) of social loafing in your group. Members who do not contribute constructively to the group project will be penalised accordingly.

Penalty for Final Report as follow:

If any student fails or scores badly in the Peer Assessment due to poor contribution to the group project, below penalty to the group project score for that individual student shall apply:

- If Peer appraisal % score for student is A, B or C, there is no penalty.

- If Peer appraisal % score for student is D, there is a 20% deduction from the group project total.

- If Peer appraisal % score for student is F or the student did not do the peer assessment (ie. no. of submission is 0), there is a 40% deduction from the group project total.

(2)   Submission Details for REPORT and RECORDED PRESENTATION

a. Please save the Report in PDF format and Presentation in mp4 format.

b. Both items should be named using your TUTORIAL GROUP & GROUP NUMBER as the filename: TBXX_GroupX. Group Leader will represent the group to upload the report and presentation in LMS by the deadline: **24th January 2025, Friday, 0900 hours**.

c. Assessments submitted after the deadline will be penalised by 20% of the total marks. Any assessment submitted more than 3 calendar days after the deadline will be given "0" marks.

Operational Requirements

Customer ALPHA

Product MUSHROOM – Picture of ONE full Pallet

Expected business forecast	• Annual business growth rate = 10% • Contract duration: 3 years
Order / Cargo Information	• Handling profile : Pallet-In-Carton-Out • Number of SKUs : 5 SKUs, each with equal amount of inventory • Inventory should be picked on a FIFO basis
Inbound Activity	• Inbound operations: Monday to Saturday, 8.30am to 6pm • Import via 40' FCL containers with palletised cargo – each container can hold 20 full pallets maximum – each full pallet is to hold 30 Inbound Shipping Cartons of single SKU. Each Inbound Shipping Carton contains 30 cans of mushrooms. • Each full pallet weighs 610kg and stands at about 1.8m high. • Each carton weighs about 12 kg. • Pallet dimension – 1.2m x 1.1m • Arrival of containers at DC : Monday to Saturday, arriving at a constant rate

Outbound Activity	• Outbound function expected to open 24-hour, 7-day-per-week.
	• Daily orders generated in 2 batches daily
	• 1st Batch printed at 0700hr; to be completed by 1800hr of the same day (60% of daily volume)
	• 2nd Batch printed at 1900hr; to be completed by 0600hr next morning (40% of daily volume).
	• Labels for "Destination Address" to be pasted on the Outbound Shipping Carton before handing over to the Freight Forwarder.
	• Estimated number of Freight Forwarder's Pick-up : 50 trucks
Storage	• Inventory stored by per-pallet basis

APPENDIX B

ORIENTAL LOGISTICS' Business Assumptions

(1) Pricing

1.	Length of Business Contract with ALPHA = 3 years; Business Growth rate = 10% per annum
2.	Handlers : Supervisor = 10 : 1
3.	Each Function per Shift should be led by at least 1 Supervisor.
4.	Monthly Basic Salary : Handler = S$1,800; Supervisor = S$2,400
5.	Temporary Staff Rate : S$15.00 per hour; subjected to one-day notice for activation
6.	Estimated monthly overhead costs = $10,000. This is to be split equally between Outbound and Inbound.
7.	Each month has a total of 4 weeks and 30 working days.
8.	Fixed Cost : Storage systems and Others = $500,000
9.	Interest rate = 5% per annum; Profit mark-up = 15%

(2a) Layout

1.	Length of Business Contract with ALPHA = 3 years; Business Growth rate = 10% per annum
2.	Access Aisle for Working Space = 70%
3.	Access Aisle for Staging Space = 50%
4.	Miscellaneous Space = 30% of (Storage + Working + Staging)
5.	Working and Staging spaces expected to hold 35% of Shift volume at any point in time
6.	30 Outbound Shipping Cartons = 1 pallet space

(2b) Technical Space per Pallet

Technical Space per Pallet (m^2)

No. of Pallet Tier	Floor Storage	APR	Double-Deep	Drive-In	Drive-Thru	Push-Back	VNA	PLS	Mobile
2	1.10	1.65	1.37	0.92	0.92	0.91	1.17	0.91	0.94
3	0.73	1.10	0.91	0.61	0.61	0.61	0.78	0.61	0.63
4	-	0.82	0.69	0.46	0.46	0.46	0.58	0.46	0.47
5	-	0.66	0.55	0.37	0.37	0.37	0.47	0.37	0.38
6	-	0.55	0.46	-	-	-	0.39	0.30	0.31
7	-	-	-	-	-	-	0.33	-	-
8	-	-	-	-	-	-	0.29	-	-

Assuming Height of DC Facility = 14 metres

APPENDIX C

Productivity Guideline

INBOUND

Process Category	Task	Productivity per man-hour	UOM	Activity	Remarks
Receiving	Unload Full Pallets from container	45	Pallet	R1, R4	-
Receiving	Take over Full Pallets from delivery truck	250	Pallet	R1, R4	-
Receiving	Unload Loose Cartons from container	300	Carton	R2, R3, R6	-
Receiving	Take over Loose Cartons from delivery truck	360	Carton	R2, R3, R6	-
Receiving	Unload Loose Items from container	300	Piece	R5	-
Receiving	Take over Loose Items from delivery truck	360	Piece	R5	-
Movement	Move UOM to Inbound Working Area	100	UOM	All	-
Quality-Check	Inspect Pallets and sign POD	120	Pallet	R1, R4	-
Quality-Check	Inspect Cartons and sign POD	300	Carton	R2, R3, R6	-
Quality-Check	Inspect Item and sign POD	120	Piece	R5	-
WMS	Enter Cargo receiving data for Pallet	200	Pallet	R1, R4	WMS Keying
WMS	Enter Cargo receiving data for Carton	200	Carton	R2, R3, R6	WMS Keying
WMS	Enter Cargo receiving data for Item	200	Carton	R5	WMS Keying
Breakbulk	Break Shipping Cartons from Pallet	180	Carton	R4	-
Breakbulk	Break Piece from Shipping Carton	300	Piece	R6	-
Labeling	Pasting of Licence Plate Number	360	UOM	ALL	-
Palletisation	Palletise Cartons	200	Carton	R2	-
Shrinkwrap	Shrinkwrap Pallet	30	Pallet	R1, R2	-
Movement	Move UOM to Inbound Staging Area	100	UOM	ALL	-
Putaway	Put away Pallet	18	Pallet	R1, R2	-
Putaway	Put away Carton	150	Carton	R3, R4	-

OUTBOUND

Process Category	Task	Productivity per man-hour	UOM	Activity	Remarks
Picking	Store Pallet; Pick Pallet	18	Pallet	SP1	-
Picking	Store Pallet; Pick Carton	120	Carton	SP2	-
Picking	Store Pallet; Pick Item	100	Item	SP3	-
Picking	Store Carton; Pick Carton	150	Carton	SP4	-
Picking	Store Carton; Pick Item	120	Item	SP5	-
Picking	Store Item; Pick Item	150	Item	SP6	-
Pick QC	Check Pallet	60	Pallet	SP1	Manual
Pick QC	Check Carton	300	Carton	SP2, SP4	Manual
Pick QC	Check Piece	500	Piece	SP3, SP5, SP6	Barcode Scanner
Pick-WMS	Update storage location information - Pallet	200	Pallet	SP1	WMS Keying
Pick-WMS	Update storage location information - Carton	200	Carton	SP2, SP4	WMS Keying
Pick-WMS	Update storage location information - Piece	200	Piece	SP3, SP5, SP6	WMS Keying
Movement	Move UOM to Outbound Working Area	100	UOM	ALL	-
Pack QC	Check Pallet	60	Pallet	SP1	-
Pack QC	Check Carton	300	Carton	SP2, SP4	-
Pack QC	Check Piece	600	Piece	SP3, SP5, SP6	Barcode Scanner
Packing	Pallet shrinkwrap & labelling	20	Pallet	CP1, CP2, CP3	-
Packing	Carton - palletised into pallets	200	Carton	CP2, CP3	-
Packing	Piece - packed into cartons & labelling	80	Piece	CP3, CP5	-
Packing	Carton - secured into Shipping Package and labelling	80	Carton	CP4, CP5	-
Pack-WMS	Enter Cargo packing data for Pallet	200	Pallet	CP1, CP2, CP3	WMS Keying
Pack-WMS	Enter Cargo packing data for Shipping Package	200	Carton	CP4, CP5	WMS Keying
Releasing	Move UOM to Outbound Staging Area	100	UOM	ALL	Manual
Releasing	Hand Pallet over to Freight Forwarder	250	Pallet	CP1, CP2, CP3	-
Releasing	Hand Shipping Package over to Freight Forwarder	360	Carton	CP4, CP5	-
Releasing	Loading Pallet into Container	45	Pallet	CP1, CP2, CP3	-
Releasing	Loading Shipping Package into Container	300	Carton	CP4, CP5	-

APPENDIX D

Week	Mon IN	Mon OUT	Mon BAL	Tue IN	Tue OUT	Tue BAL	Wed IN	Wed OUT	Wed BAL	Thu IN	Thu OUT	Thu BAL	Fri IN	Fri OUT	Fri BAL	Sat IN	Sat OUT	Sat BAL	Sun IN	Sun OUT	Sun BAL
Week 1	35742	54191	52858	66831	51706	67983	54506	56353	66136	150000	139772	76364	134643	131286	79721	144000	66000	157721	0	66000	91721
Week 2	91534	54191	129064	66186	135000	60250	138955	129131	70074	119112	109461	79725	135000	146601	68124	189000	165000	92124	0	60000	32124
Week 3	135576	57483	110217	150000	73682	186535	147000	210000	123535	87959	64449	147045	61762	124253	84554	161000	44057	201497	0	124208	77289
Week 4	84814	143065	19038	153000	99710	72328	153000	61382	163946	145899	122352	187493	99921	91766	195648	195000	183000	207648	0	78387	129261
Week 5	39185	51789	116657	62942	104689	74910	112322	52747	134485	50267	43471	141281	142490	79696	204075	141623	165000	180698	0	111278	69420
Week 6	79517	80635	68302	195000	136073	127229	98534	43420	182343	171000	144000	209343	127824	138676	198491	102753	147732	153512	0	67492	86020
Week 7	118823	95746	109097	101325	79539	130883	142553	180000	93436	103449	97665	99220	102968	128483	73705	144000	105000	112705	0	108797	3908
Week 8	195000	126833	72075	79741	116431	35385	129000	142875	21510	134601	54302	101809	141000	131339	111470	116194	87011	140653	0	111828	28825
Week 9	210000	131559	107266	132000	146281	92985	62834	88690	72129	145005	149701	67433	62925	78556	51802	37481	58232	31051	0	7500	23551
Week 10	141000	121430	43121	135000	94683	83438	134067	37180	180325	30031	129991	80365	141000	144762	76603	91983	39916	128670	0	50550	78120
Week 11	131050	105000	104170	101896	73026	133040	39049	106664	65425	144000	143801	65624	119411	70799	114236	143132	109300	148068	0	73697	74571
Week 12	130595	33052	172114	117129	101655	187588	105000	97459	195129	41259	98209	138179	34604	52471	120312	126223	115663	130872	0	70815	60057
Week 13	99483	76376	83164	67770	70809	80125	53552	82175	51502	100529	87136	64895	171000	75746	160149	123429	126680	156898	0	58296	98602
Week 14	113882	50917	161567	126691	108523	179735	127444	127814	179365	103722	132000	151087	76014	109892	117209	105000	100044	122165	0	111905	10260
Week 15	67219	63980	13499	135155	36571	112083	145359	132000	125442	56803	141751	40494	135000	138169	37325	68183	9000	96508	0	50123	46385
Week 16	150000	78329	118056	52548	45887	124717	130130	110161	144686	42519	96523	90682	82755	109120	64317	153000	48822	168495	0	74017	94478
Week 17	147062	95876	145664	53710	131725	67649	183000	125202	125447	93979	84863	134563	106524	76739	164348	145621	144000	165969	0	63810	102159
Week 18	50416	120889	31686	137244	65889	103051	165000	126962	141089	42599	87698	95990	32943	111000	17933	135000	9000	143933	0	90000	53933
Week 19	63071	69002	48002	59555	56408	51149	87953	65663	73439	130217	108610	95046	115157	139174	71029	62036	66596	66469	0	58463	8006
Week 20	120762	70917	57851	153000	47288	163563	31911	38619	156855	112040	144067	124828	120515	83441	161902	62742	98204	126440	0	112884	13556
Week 21	189000	148130	54426	105000	108733	50693	130839	44900	136632	131592	99584	168640	85064	117312	136392	107404	68006	175790	0	111797	63993
Week 22	117272	35745	145520	135000	139532	140988	132000	88375	187613	140469	192000	136082	148508	92430	192160	49946	69051	173055	0	80818	92237
Week 23	141000	99435	133802	119805	108223	145384	105345	127788	122941	82114	68408	136647	153000	118385	171262	58131	60267	169126	0	105474	63652
Week 24	118439	67235	114856	60381	50007	125230	121775	56250	190755	56656	144000	103411	132923	39331	197003	55514	66358	186159	0	31922	154237
Week 25	47631	139913	61955	115386	125850	51491	94467	74382	71576	93739	94286	71029	84073	85523	69579	180000	101332	148247	0	116387	31860
Week 26	139041	33207	137694	57440	105172	89962	180000	146204	123758	88760	61407	151111	86965	33409	204667	116009	117351	203325	0	89116	114209
Week 27	81790	144609	51390	53531	39138	65783	63149	85134	43798	130115	47643	126270	135170	56369	205071	80559	144000	141630	0	56703	84927
Week 28	138310	165000	58237	145672	171000	32909	87448	44750	75607	64687	119946	20348	144276	93564	71060	148093	122308	96845	0	40759	56086
Week 29	165000	145988	75098	61721	61941	74878	86708	148061	13525	150000	100277	63248	64057	90902	36403	180000	71124	145279	0	113655	31624
Week 30	93285	53700	71209	136642	45511	162340	37485	96663	103162	102628	124629	81161	150000	137664	93497	140619	119608	114508	0	88315	26193
Week 31	87360	82570	30983	165000	64116	131867	85053	110508	106412	111451	105965	111898	128244	34420	205722	130237	144000	191959	0	66570	125389
Week 32	36157	72257	89289	123016	58175	154130	86216	115167	125179	108471	146337	87313	109177	143987	52503	180000	85834	146669	0	120000	26669
Week 33	60343	34676	52336	159000	117895	93441	112172	92141	113472	93853	38148	169177	77980	39009	208148	74218	88999	193367	0	48230	145137
Week 34	110604	141730	114011	86234	33479	166766	111529	75585	202710	146421	150000	199131	110184	141000	168315	54682	104868	118129	0	108410	9719
Week 35	120000	117474	12245	137795	38455	111585	97523	63843	145265	122555	210000	57820	43977	82402	19395	130049	80870	68574	0	60000	8574
Week 36	71829	53159	27244	140121	38875	128490	89441	135556	82375	117958	100661	99672	105780	73042	132410	78512	65284	145638	0	76414	69224
Week 37	48900	104730	13394	124793	105968	32219	106597	108645	30171	124054	32790	121435	44673	55293	110815	150000	105763	155052	0	114029	41023
Week 38	116424	45000	112447	61551	61542	112456	165000	142391	135065	54198	46361	142902	103689	96283	150308	75362	32305	193365	0	137811	55554
Week 39	135008	92299	98263	119273	70991	146545	138147	134501	150191	53307	122304	81194	121737	92593	110338	78099	56200	132237	0	40665	93572
Week 40	88531	67869	114234	58464	129259	43529	86533	104960	25102	66514	81756	9860	124225	81734	52351	132000	84000	100351	0	66000	34351
Week 41	135000	76172	93179	195000	171000	117179	34346	64353	87172	93881	150000	31053	65184	88480	7757	127714	120000	15471	0	6600	8871
Week 42	165000	97841	76030	180000	131715	124315	128732	95979	157068	114806	148341	123533	53553	76330	100756	129110	9000	220866	0	45770	175096
Week 43	165000	132670	207426	45810	99000	154236	65296	89743	129789	82529	44873	167445	121782	53850	235377	73360	77392	231345	0	34024	197321
Week 44	121020	81610	236731	122477	141000	218208	144000	131628	230580	63857	50342	244095	57288	96009	205374	121589	132071	194892	0	9000	185892
Week 45	55691	30569	211014	97925	107391	201548	93151	51977	242722	51344	88240	205826	77583	109618	173791	84803	81291	177303	0	6000	171303
Week 46	116946	41481	246768	105878	145295	207351	40946	116721	131576	124684	31873	224387	137359	144000	217746	77919	59516	236149	0	43674	192475
Week 47	82964	81510	193929	136347	124480	205796	86171	54728	237239	127748	120000	244987	78236	90000	233223	123478	134119	222582	0	119603	102979
Week 48	84259	106369	80869	174000	129481	125388	192000	137462	179926	58512	128753	109685	144000	126701	126984	144000	94141	176843	0	120605	56238
Week 49	171000	89752	137486	112029	61399	188116	100270	143961	144425	183000	103804	223621	131817	150000	205438	91306	74549	222195	0	89743	132452
Week 50	115513	34830	213135	111343	144000	180478	127886	144000	164364	119307	114791	168880	63500	101820	130560	127820	146323	112057	0	40305	71752
Week 51	106251	58041	119962	127725	83902	163785	171000	107495	227290	71367	73154	225503	57195	104285	178413	145612	134818	189207	0	103919	85288
Week 52	149997	77278	158007	73973	108243	123737	141964	47775	217926	95379	150000	163305	91081	135000	119386	165000	105000	179386	0	82339	97047
Week 53	143944	105000	135991	121027	135000	122018	114827	32740	204105	65846	72448	197503	126252	120390	203365	94411	62504	235272	0	74076	161196

*Volume given in terms of cartons.

RUBRICS (REPORT & PRESENTATION) - Total : 100 marks; Weightage : 30%

A) LANGUAGE, ORGANISATION AND FORMATTING - 10 MARKS

Proficient 10.0 to 8.0	Developing 7.5 to 5.0	Underperforming 4.5 to 0.0	Max
No spelling or grammatical errors. Written in formal English and without slipping into conversational English. Usage of appropriate capitalisation, punctuation and proper sentence structure. Cover page was duly filled and Appendix was appropriately utilised. Report followed the conventional writing structure and was organised with an Introduction, body and conclusion. Header and footer were used. Headings and sub-headings were used to enhance the structure and flow of the report. Overall report was tidy, consistent and professional. Resources used were consistently cited and referenced. APA standards applied.	Some spelling or grammatical errors but does not impede comprehension. Writing is inconsistent; switching from formal to informal English. Attention was paid to ensure capitalisation, punctuation and proper sentence structure even though there were some signs of shorthand commonly used in social platforms. Cover page was incomplete; Header and footer omitted. Report followed conventional writing structure but the lack of headings and sub-headings or the poor choice of headings or sub-headings resulted in paper that did not have a strong logical flow. Lack of paragraphs resulted in lack of focus. Overall report was tidy with some inconsistencies. Resources used were cited and referenced with omissions. APA standards not applied.	Numerous spelling and grammatical errors such that it is difficult for the marker to understand the key points. Report is written in informal and/or conversational English throughout eg. Typical of social media chats. There was a lack of appropriate capitalisation, punctuation and proper sentence structure. Communication lacks clarity and attention to the basics of writing. Cover page was omitted / incomplete or lacked accuracy. Appendix was not utilised or inappropriately used. Header and footer were omitted. Report did not adhere to conventional writing structure. Omission of headings and sub-headings and lack of paragraphs resulted a lack in organisation and focus. Overall report showed a lack of attention to organisation and formatting. Resources used were not cited and reference was incomplete/missing. APA standards not applied.	10

B) MANPOWER RESOURCES (Questions a & b) - 25 MARKS

Proficient 25.0 to 20.0	Developing 19.5 to 12.5	Underperforming 12.0 to 0.0	Max
Question a Insightful and thorough explanations that demonstrate clear understanding of the service level. Excellent thoroughness in showing the workings and/or visuals to derive the answer. Question b Insightful and thorough explanations in deriving the work-hours and manpower calculations; with clear links to course materials. Excellent thoroughness in showing the workings and/or visuals in deriving the answers.	Question a Reasonable explanations that demonstrate somewhat clear understanding of the service level. Satisfactory workings and/or visuals shown to explain how the answers are derived. Question b Reasonable explanations in deriving the work-hours and manpower calculations; with somewhat clear links to course materials. Satisfactory workings and/or visuals shown to explain how the answers are derived.	Question a Unclear explanations about the service level. Poor and/or unclear workings and/or visuals shown to explain how the answers are derived. Question b Poor level of explanations in deriving the work-hours and manpower calculations; with unclear links to course materials. Poor level and/or messy workings and/or visuals shown to explain how the answers are derived.	25

C) LAYOUT DESIGN & SPACE REQUIREMENTS (Questions c & d) - 20 MARKS

Proficient	Developing	Underperforming	Max
20.0 to 16.0	15.5 to 10.0	9.0 to 0.0	
Question c Solutions recommended were suitable and effective for layout, safety and security. Clear illustrations and legends were presented to demonstrate the effectiveness of the solutions. Question d Insightful and thorough explanations in deriving the layout values; with clear links to course materials. Excellent thoroughness in showing the workings and/or visuals in deriving the answers.	Question c Solutions recommended were fair but limited in the effectiveness for layout, safety and security. Relevant illustrations and legends were superficially presented to demonstrate the effectiveness of the solutions. Question d Reasonable explanations in deriving the layout values; with somewhat clear links to course materials. Satisfactory workings and/or visuals shown to explain how the answers are derived.	Question c Solutions were badly constructed and not effective for layout, safety and security. Illustrations and legends were absent or minimally shown. Question d Poor level of explanations in deriving the layout values; with unclear links to course materials. Poor level and/or messy workings and/or visuals shown to explain how the answers are derived.	20

D) DC PRICINGS (Question e) - 15 MARKS

Proficient	Developing	Underperforming	Max
15.0 to 12.0	11.5 to 7.5	7.0 to 0.0	
Insightful and thorough explanations in deriving the pricings; with clear links to course materials. Excellent thoroughness in showing the workings and/or visuals in deriving the answers.	Reasonable explanations in deriving the pricings; with somewhat clear links to course materials. Satisfactory workings and/or visuals shown to explain how the answers are derived.	Poor level of explanations in deriving the pricings; with unclear links to course materials. Poor level and/or messy workings and/or visuals shown to explain how the answers are derived.	15

E) DC AUTOMATION IMPLEMENTATION (Questions f) - 15 MARKS

Proficient	Developing	Underperforming	Max
15.0 to 12.0	11.5 to 7.5	7.0 to 0.0	
Insightful and thorough explanations on the manual versus automated steps Concepts and theories learnt from course materials and/or secondary research were applied correctly and skilfully based on the nature of the company in the case study.	Somewhat reasonable explanations on the manual versus automated steps Concepts and theories learnt from course materials and/or secondary research were applied with reasonable accuracy. However, there were evidence of incorrect understanding / forced application.	Poor explanations on the manual versus automated steps Concepts and theories learnt from course materials and/or secondary research were applied without clear identification or definition demonstrating a lack of understanding. There were evidence of concepts and principles being included in the report 'for show' but was either inappropriate, irrelevant or not utilised.	15

1) STRUCTURE OF PRESENTATION - 5 MARKS (Shared mark for all group members)

Proficient 5.0 to 4.0	Developing 3.5 to 2.5	Underperforming 2.0 to 0.0	Max
The Presentation had no grammatical, spelling or formatting error and were consistent in style. Content had a logical flow from one part / presenter to another. Images and visual tools enhanced the communication value of the presentation. Overall, the slides were audience-centric, persuasive and professional.	The Presentation had detectable grammatical or spelling but did not impede communication. Some formatting error or were inconsistent in style but not too distracting. Content had a logical flow from one part / presenter to another. Images and visual tools were used appropriately but some slides were too wordy or some images were superfluous to the presentation. Overall, the slides were informative.	The Presentation had glaring grammatical, spelling or formatting error such that it was distracting. Content flow from one part / presenter to another was a bit abrupt or random. Images and visual tools were used but either too many; served very little purpose other than to cover up any lack in substance, or too few such that the audience had to rely on the Presenter to make sense of the content or 'imagine' what the Presenter is trying to communicate. Overall, the slides appeared to be hastily put together without vetting or careful thought.	5

2) PACE AND INTONATION OF SPEECH, PROJECTION OF VOICE AND PRONUNCIATION OF WORDS - 5 MARKS (Individual)

Proficient 5.0 to 4.0	Developing 3.5 to 2.5	Underperforming 2.0 to 0.0	Max
Natural but not conversational / informal presentation. Proper English language. Audible and well-paced; not too fast or slow and consistent.	Affected; artificial, pretentious, and designed to impress. Too performative. Sounded like broadcaster or emcee for an event. Accidental use of Singlish but not distracting. Audible (or inaudible but able to self-correct when there are cues from the audience) and either too fast or too slow.	Monotonous; dull, repetitive, lacking in variation in tone or pitch. Unable to maintain formal presentation language, frequent use of Singlish. Inaudible and unable to project voice despite being asked to speak up (no physical ailments or pre-condition).	5

3) CONFIDENCE, PERSUASIVENESS AND EXPRESSION - 5 MARKS (Individual)

Proficient 5.0 to 4.0	Developing 3.5 to 2.5	Underperforming 2.0 to 0.0	Max
Highly persuasive; Natural; not overly rehearsed or contrived and communication was logical and clear. Expression is pleasant / open and alert throughout presentation.	Persuasive, nervous but managed such that it does not distract the audience and communication was achieved. Occasionally, unaware of expression and comes across as distracted or preoccupied but able to self-correct.	Not persuasive. Unable to maintain composure and confidence. Unaware of expression and its impact on presentation (no physical ailments or pre-condition).	5